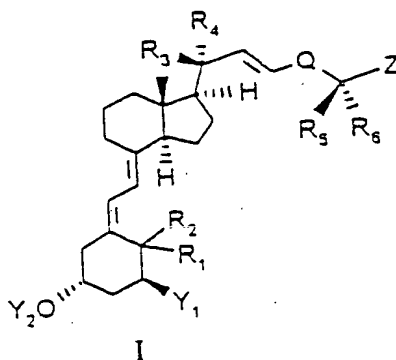


Claims

1. Vitamin D derivatives of general formula I



in which

- Y_1 means a hydrogen atom, a hydroxyl group, an alkanoyloxy group with 1 to 12 C atoms or an aroyloxy group,
- Y_2 means a hydrogen atom or an alkanoyl group with 1 to 12 C atoms or an aroyl group,
- R_1 and R_2 each mean a hydrogen atom or together an exocyclic methylene group,
- R_3 and R_4 , independently of one another, mean a hydrogen atom, a chlorine or fluorine atom, an alkyl group with 1 to 4 carbon atoms, together a methylene group or together with quaternary carbon atom 20 a 3- to 7-membered, saturated or unsaturated carbocyclic ring,
- Q means a straight-chain or branched carbon unit with up to 10 carbon atoms, which at any positions can have hydroxyl groups (in α - or β -position), which in turn can be etherified or esterified, keto groups, amino groups or halogen atoms,

R_5 and R_6 at the same time each mean a hydrogen atom, a chlorine or fluorine atom, a trifluoromethyl group, a straight-chain or branched-chain, saturated or unsaturated hydrocarbon radical with up to 4 carbon atoms or R_5 and R_6 together with carbon atom 25 mean a 3- to 7-membered, saturated or unsaturated carbocyclic ring and

Z means a five- or six-membered carbo- or heterocyclic ring, which can be saturated, unsaturated or aromatic, and at any positions one or more alkyl chains, which can be straight-chain or branched, saturated or unsaturated, and at any points can be interrupted by oxa, thia or aza groups (substituted or unsubstituted) or sulfoxide or sulfo groups or can carry substituents (hydroxy groups, halogen atoms).

2. Vitamin D derivatives of general formula I according to claim 1, in which R_5 and R_6 together with carbon atom C-25 mean a cyclopropyl ring and Z means an aromatic or heteroaromatic ring.

3. Vitamin D derivatives according to claim 2, in which Z has the meaning of an optionally substituted phenyl or oxazole or thiazole ring.

4. Vitamin D derivatives of general formula I according to claim 1, in which Q has the meaning of a hydroxymethyl or carbonylmethyl group.

5. Vitamin D derivatives of general formula I according to claim 1,

(5Z,7E,22E)-(1S,3R,24R)-25-(5-Propyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-propyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-methyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-methyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-ethyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-ethyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-butyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-butyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-pentyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-pentyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-propylthiazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-propylthiazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-methylthiazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-methylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-ethylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-ethylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-butylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-butylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-pentylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-pentylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-propylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-propylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-methylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-methylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-ethylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-ethylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-butylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-butylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-pentylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-pentylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-propylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-propylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-methylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-methylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-ethylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-ethylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-butylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-butylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-pentylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-pentylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-propylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-propylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-methylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-methylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-ethylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-ethylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-butylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-butylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-pentylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-pentylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-propylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-propylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-methylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-25-(5-methylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-25-(5-ethylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-25-(5-ethylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-25-(5-butylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-25-(5-butylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-25-(5-pentylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-25-(5-pentylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-25-(4-propyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-25-(4-propyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-25-(4-methyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-25-(4-methyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-25-(4-ethyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-ethyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-butyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-butyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-pentyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-pentyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-propylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-propylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-methylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-methylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-ethylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-ethylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-butylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-butylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-pentylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-pentylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-propylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-propylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-methylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-methylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-ethylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-ethylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-butylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-butylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-pentylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-pentylimidazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-propylfuran-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-propylfuran-2-yl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-methylfuran-2-yl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-methylfuran-2-yl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-ethylfuran-2-yl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-ethylfuran-2-yl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-butylfuran-2-yl)-26,27-cyclo-
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9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-pentylfuran-2-yl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-propylthiophen-2-yl)-26,27-
cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-propylthiophen-2-yl)-26,27-
cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-methylthiophen-2-yl)-26,27-
cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-methylthiophen-2-yl)-26,27-
cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-ethylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-ethylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-butylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-butylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-pentylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-pentylthiophen-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-propylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-propylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-methylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-methylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-ethylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-ethylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-butylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-butylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-pentylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-pentylpyrrol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(3-methyl-1,2,4-oxadiazol-5-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(3-methyl-1,2,4-oxadiazol-5-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(3-ethyl-1,2,4-oxadiazol-5-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(3-ethyl-1,2,4-oxadiazol-5-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(3-propyl-1,2,4-oxadiazol-5-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(3-propyl-1,2,4-oxadiazol-5-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(3-butyl-1,2,4-oxadiazol-5-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(3-butyl-1,2,4-oxadiazol-5-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(3-pentyl-1,2,4-oxadiazol-5-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(3-pentyl-1,2,4-oxadiazol-5-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-methyl-1,3,4-oxadiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-methyl-1,3,4-oxadiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-ethyl-1,3,4-oxadiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-ethyl-1,3,4-oxadiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-propyl-1,3,4-oxadiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-propyl-1,3,4-oxadiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-butyl-1,3,4-oxadiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-butyl-1,3,4-oxadiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-pentyl-1,3,4-oxadiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-pentyl-1,3,4-oxadiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-phenyl-26,27-cyclo-9,10-
 secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-phenyl-26,27-cyclo-9,10-
 secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(4-methylphenyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

- (5Z,7E,22E)-(1S,3R,24S)-25-(4-methylphenyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(4-ethylphenyl)-26,27-cyclo-9,10-
 secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(4-ethylphenyl)-26,27-cyclo-9,10-
 secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(4-propylphenyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(4-propylphenyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(4-butylphenyl)-26,27-cyclo-9,10-
 secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(4-butylphenyl)-26,27-cyclo-9,10-
 secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(4-pentylphenyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(4-pentylphenyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(3-methylphenyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(3-methylphenyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(3-ethylphenyl)-26,27-cyclo-9,10-
 secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(3-ethylphenyl)-26,27-cyclo-9,10-
 secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(3-propylphenyl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(3-propylphenyl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(3-butylphenyl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(3-butylphenyl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(3-pentylphenyl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(3-pentylphenyl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-[4-(1-methylethyl)phenyl]-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-[4-(1-methylethyl)phenyl]-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-[3-(1-methylethyl)phenyl]-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-[3-(1-methylethyl)phenyl]-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(2-pyridyl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(2-pyridyl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(6-methyl-2-pyridyl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(6-methyl-2-pyridyl)-26,27-cyclo-

9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-methyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-methyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(4-methyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(4-methyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(6-ethyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(6-ethyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-ethyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(5-ethyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(4-ethyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(4-ethyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(6-propyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(6-propyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(5-propyl-2-pyridyl)-26,27-cyclo-
 9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-propyl-2-pyridyl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-propyl-2-pyridyl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-propyl-2-pyridyl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(6-butyl-2-pyridyl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(6-butyl-2-pyridyl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-butyl-2-pyridyl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5-butyl-2-pyridyl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(4-butyl-2-pyridyl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(4-butyl-2-pyridyl)-26,27-cyclo-
9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5,5-dimethyl-2-oxazolin-2-yl)-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5,5-dimethyl-2-oxazolin-2-yl)-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5,5-diethyl-2-oxazolin-2-yl)-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-25-(5,5-diethyl-2-oxazolin-2-yl)-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-[1S,3R,24R,25(R)]-25-(5-methyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24S,25(R)]-25-(5-methyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24R,25(S)]-25-(5-methyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24S,25(S)]-25-(5-methyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24R,25(R)]-25-(5-ethyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24S,25(R)]-25-(5-ethyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24R,25(S)]-25-(5-ethyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24S,25(S)]-25-(5-ethyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24R,25(R)]-25-(5-propyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24S,25(R)]-25-(5-propyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24R,25(S)]-25-(5-propyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24S,25(S)]-25-(5-propyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24R,25(R)]-25-(5-butyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-[1S,3R,24S,25(R)]-25-(5-butyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24R,25(S)]-25-(5-butyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24S,25(S)]-25-(5-butyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24R,25(R)]-25-(5-phenyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24S,25(R)]-25-(5-phenyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24R,25(S)]-25-(5-phenyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-[1S,3R,24S,25(S)]-25-(5-phenyl-2-oxazolin-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,20S,24R)-25-(5-propyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,20S,24S)-25-(5-propyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,20S,24R)-25-(5-methyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,20S,24S)-25-(5-methyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,20S,24R)-25-(5-ethyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,20S,24S)-25-(5-ethyloxazol-2-yl)-26,27-
 cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(5-butyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(5-butyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(5-pentyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(5-pentyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(5-propylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(5-propylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(5-methylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(5-methylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(5-ethylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(5-ethylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

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(5Z,7E,22E)-(1S,3R,20S,24S)-25-(5-butylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(5-pentylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(5-pentylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(4-propyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(4-propyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(4-methyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(4-methyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(4-ethyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(4-ethyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(4-butyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(4-butyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

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(5Z,7E,22E)-(1S,3R,20S,24S)-25-(4-pentyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(4-propylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(4-propylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

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cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(4-methylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(4-ethylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(4-ethylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

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(5Z,7E,22E)-(1S,3R,20S,24S)-25-(4-butylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24R)-25-(4-pentylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,20S,24S)-25-(4-pentylthiazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-20-methyl-25-(5-propyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-20-methyl-25-(5-propyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-20-methyl-25-(5-methyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24S)-20-methyl-25-(5-methyloxazol-2-yl)-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

(5Z,7E,22E)-(1S,3R,24R)-25-(5-ethyloxazol-2-yl)-20-methyl-26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

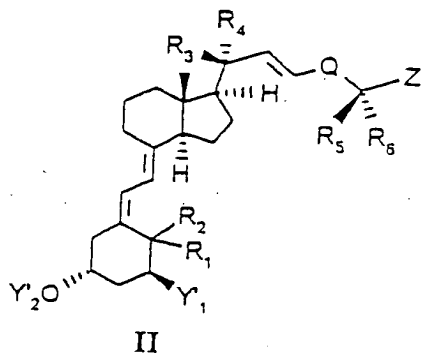
(5Z,7E,22E)-(1S,3R,24S)-25-(5-ethyloxazol-2-yl)-20-methyl-

26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-25-(5-butyloxazol-2-yl)-20-methyl-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-25-(5-butyloxazol-2-yl)-20-methyl-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-20-methyl-25-(5-pentyloxazol-2-yl)-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-20-methyl-25-(5-pentyloxazol-2-yl)-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-20-methyl-25-(5-propylthiazol-2-yl)-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-20-methyl-25-(5-propylthiazol-2-yl)-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-20-methyl-25-(5-methylthiazol-2-yl)-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-20-methyl-25-(5-methylthiazol-2-yl)-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-25-(5-ethylthiazol-2-yl)-20-methyl-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-25-(5-ethylthiazol-2-yl)-20-methyl-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-25-(5-butylthiazol-2-yl)-20-methyl-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24S)-25-(5-butylthiazol-2-yl)-20-methyl-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
(5Z,7E,22E)-(1S,3R,24R)-25-(5-pentylthiazol-2-yl)-20-methyl-
26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

- (5Z, 7E, 22E) - (1S, 3R, 24S) - 25 - (5-pentylthiazol-2-yl) - 20-methyl-
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24R) - 20-methyl-25 - (4-propyloxazol-2-yl) -
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24S) - 20-methyl-25 - (4-propyloxazol-2-yl) -
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24R) - 20-methyl-25 - (4-methyloxazol-2-yl) -
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24S) - 20-methyl-25 - (4-methyloxazol-2-yl) -
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24R) - 25 - (4-ethyloxazol-2-yl) - 20-methyl-
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24S) - 25 - (4-ethyloxazol-2-yl) - 20-methyl-
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24R) - 25 - (4-butylloxazol-2-yl) - 20-methyl-
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24S) - 25 - (4-butylloxazol-2-yl) - 20-methyl-
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24R) - 20-methyl-25 - (4-pentylloxazol-2-yl) -
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24S) - 20-methyl-25 - (4-pentylloxazol-2-yl) -
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24R) - 20-methyl-25 - (4-propylthiazol-2-yl) -
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24S) - 20-methyl-25 - (4-propylthiazol-2-yl) -
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol
- (5Z, 7E, 22E) - (1S, 3R, 24R) - 20-methyl-25 - (4-methylthiazol-2-yl) -
 26, 27-cyclo-9, 10-secocholesta-5, 7, 10(19), 22-tetraene-1, 3, 24-triol

26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-20-methyl-25-(4-methylthiazol-2-yl)-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(4-ethylthiazol-2-yl)-20-methyl-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(4-ethylthiazol-2-yl)-20-methyl-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(4-butylthiazol-2-yl)-20-methyl-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(4-butylthiazol-2-yl)-20-methyl-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24R)-25-(4-pentylthiazol-2-yl)-20-methyl-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol
 (5Z,7E,22E)-(1S,3R,24S)-25-(4-pentylthiazol-2-yl)-20-methyl-
 26,27-cyclo-9,10-secocholesta-5,7,10(19),22-tetraene-1,3,24-triol

6. Process for the production of vitamin D derivatives of
 general formula I, whereby a compound of general formula II



in which

Y'_1 means a hydrogen atom or a protected hydroxy group and

Y'_2 means a hydroxy protective group

R_1 and R_2 each mean a hydrogen atom or together an exocyclic methylene group,

R_3 and R_4 , independently of one another, mean a hydrogen atom, a chlorine or fluorine atom, an alkyl group with 1 to 4 carbon atoms, together a methylene group or together with quaternary carbon atom 20 a 3- to 7-membered, saturated or unsaturated carbocyclic ring,

Q means a straight-chain or branched carbon unit with up to 10 carbon atoms, which at any positions can have hydroxyl groups (in α - or β -position), which in turn can be etherified or esterified, keto groups, amino groups or halogen atoms,

R_5 and R_6 at the same time each mean a hydrogen atom, a chlorine or fluorine atom, a trifluoromethyl group, a straight-chain or branched-chain, saturated or unsaturated hydrocarbon radical with up to 4 carbon atoms or R_5 and R_6 together with carbon atom 25 mean a 3- to 7-membered, saturated or unsaturated carbocyclic ring and

Z means a five- or six-membered carbo- or heterocyclic ring, which can be saturated, unsaturated or aromatic, and at any positions one or more alkyl chains, which can be straight-chain or branched, saturated or unsaturated, and at any points can be interrupted by

oxa, thia or aza groups (substituted or unsubstituted) or sulfoxide or sulfo groups or can carry substituents (hydroxy groups, halogen atoms),

is reacted by simultaneous or successive cleavage of the hydroxy protective groups and optionally by partial or complete esterification(s) or etherification(s) of free hydroxy groups.

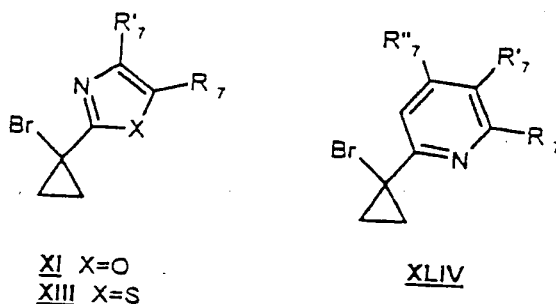
7. Use of the vitamin D derivatives of general formula I for the production of pharmaceutical agents.

8. Use of the vitamin D derivatives of general formula I according to claim 7 for the therapy of hyperproliferative diseases of the skin (psoriasis, acne, ichthyosis) as well as tumor diseases and precancerous stages (e.g., tumors of the intestines, carcinomas of the breast, lung tumors, prostate carcinomas, leukemias, T-cell lymphomas, actinic keratoses, cervix dysplasias, also auto-immune diseases (multiple sclerosis, diabetes mellitus type I, myasthenia gravis, lupus erythematosus), rejection reactions in the case of autologous, allogeneic or xenogeneic transplants, as well as AIDS; in addition, therapeutic use in the case of atrophic skin or wound healing is possible, as well as the therapy of secondary hyperparathyroidism, renal osteodystrophia, as well as senile and postmenopausal osteoporosis, diabetes mellitus type II and the therapy of degenerative diseases of the peripheral and central nervous system (Alzheimer's disease and amyotrophic lateral sclerosis) as well as the regulation of hair growth.

9. Use of the vitamin D derivatives of general formula I according to claim 7, which antagonize the action of calcitriol

in HL 60 cells, for the therapy of hypercalcemias (hypervitaminosis D, intoxication with calcitriol or its analogues) or granulomatous diseases (sarcoidosis, tuberculosis), as well as paraneoplastic hypercalcemias (thus osteolytic metastases and tumors with increased synthesis of parathormone-related peptides) and hypercalcemias in hyperparathyroidism and for birth control or as immunostimulants, as well as in hirsutism, and for the therapy and prophylaxis of arteriosclerosis, as well as for the therapy of inflammatory diseases (rheumatoid arthritis, Crohn's disease, ulcerative colitis, and granulomatous diseases).

10. Intermediate products of general formulas XI, XII, and XLIV within the production of vitamin D derivatives of general formula I according to claim 1:



in which

R_7 , R'_7 and R''_7 , independently of one another, mean a hydrogen atom, a straight-chain or branched, saturated or unsaturated alkyl radical with up to 12 carbon atoms, which at any points can be interrupted by oxa, thia or aza groups (substituted or unsubstituted) or sulfoxide or sulfo groups or can carry other substituents (free or protected hydroxy groups,

halogen atoms).